Space Weather Forecast

Issued on Sunday, 06 August 2023 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1-G2 Minor/Moderate storm Likely at times from Coronal Mass Ejection arrivals Days 2-3. Further R1-R2 Radio blackouts likely Day 1, then chance of isolated R1-R2 Radio Blackouts Days 2-3.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High, with a Strong flare at 05/2221 UTC from a complex region near the western limb. Of the seven numbered (and two unnumbered) regions on the visible disc, there is one other notable region at present, in the northwest. The other regions currently on the disc have so far been relatively stable. The strong flare produced a significant Coronal Mass Ejection (CME) with preliminary values entered into Enlil for modelling. Several smaller CMEs have been observed on imagery in the past 24 hours, but these are not considered significant nor directed towards the interior planets.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been predominantly at slow-ambient levels and are currently fluctuating around 350 km/s. The total interplanetary magnetic field strength (Bt) has been Weak to Moderate. The important north-south component, (Bz) has mostly been weak and towards the north (positive) with a brief southward period 05/1730-1830 UTC. Geomagnetic activity was initially Unsettled (Kp3) due to the waning influence of a CME arrival on 05 Aug, but has since been Quiet (Kp0-2).
Energetic Particles / Solar Radiation: The observed count rate of energetic particles (high energy protons) rose in response to flaring on 05 Aug, reaching S1/Minor Storm, easing back below the S1 threshold around 06/0530 UTC.

Four-Day Space Weather Forecast Summary
Solar Activity: Further Moderate flares are likely initially, mainly from two previously mentioned regions in the west and northwest of the disc, with a decreasing chance of Moderate flares from Day 2 (07 Aug) onwards as these regions rotate across the western limb. Overall activity this period High initially but expected to reduce, becoming Moderate to Low by Day 2.

Solar Wind / Geomagnetic Activity: Activity is expected to be initially Quiet to Unsettled (Kp 0-3). Increasing to Unsettled or Active (Kp3-4) Days 2-3, with G1/Minor Geomagnetic Storms likely. Chance of G2/Moderate Storm intervals, most likely later Day 2 or early Day 3 (08 Aug). Activity then declining Day 4 (09 Aug) in the absence of further Coronal Mass Ejection (CME) arrivals. Solar winds expected to remain largely at or close to background levels Day 1, increasing 450-500 km/s, possibly 600km/s in response to CME arrivals Days 2-3.

Energetic Particles / Solar Radiation: Solar radiation is expected to remain below the S1/Minor Storm Level, with diminishing probabilities as complex regions rotate across the western limb and onto the far-side.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	10	60	70	30
Strong	G3	No	1	10	15	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	50	40	20
Very Active	R3 to R5 X	Yes	10	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	40	20	10	5
Very Active	≥ S3 *	No	5	5	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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